

clear of the head. The only other alteration I should desire would be the strengthening of the brightness all along the middle or axis of the tail, and the smoothing away of all other features such as now seem indicated in the body of it. Trivial as these changes may seem, the ultimate value of the drawing, if it should ever have any, must depend on its accuracy. The feebleness of the feature which attracted my attention may at the same time be inferred from its absence in the adjoining contemporaneous sketch accompanying Mr. Seabroke's letter, while its reality is proved by the descriptions in the two letters which follow. As regards the "rift" or "shadow," on which stress is laid by Mr. Williams at Cannes, one cannot help suspecting that this impression was the effect of contrast *only*—contrast between the complete absence of tail in that quarter, and the unrecognised presence of exceedingly feeble luminosity due to the extension and diffusion of cometic matter roundabout. It would require very strong evidence indeed to establish the real presence of *shadow* in the ordinary sense of that term.

One other point deserves notice. You have three contemporaneous accounts, from Rugby, Hawkhurst (Kent), and Cheltenham, all referring to the morning of October 23. Considering how rude and unsettled the weather has been for weeks past, so extensive a clearance was rather remarkable.

The brightness of this comet's tail may be inferred from an observation which I made during the current week, and which will perhaps excite as much surprise, if not incredulity, in others as it did in me. Sunday night was clear and bright, with a moon four days past the full. I was at an hotel in London, and on the stroke of three I stole into a vacant room in the third floor, the window of which looked south-east. Here I stood for a full hour looking for the comet, scarcely able to credit my senses, as the morning drew on without my seeing it. With the naked eye I could see stars of the 5th, and with a binocular, stars in Hydra of the 7th or even 8th magnitude; but no comet. At first I was uncertain, for this very reason, as to the identity of a *Hydrae*, although if I had not been seeing the comet flaring below it so frequently during the last three or four weeks, no such doubt would have occurred to me. At last, as all the small stars of Hydra gradually settled themselves in my recollection in their right places, and I knew *exactly* where the whole length of the comet *must* be, and the whole being then well above the opposite roof, I fancied at times that I could make out a faint illumination in the proper place; but not even then, with the binocular, could I find the head; nor could I, without previous knowledge, have been able to testify confidently to the presence of the tail.

I regret that I cannot condense this account without sacrificing some of the conditions which help to make so strange a disappearance credible. If anyone had told me on the 23rd that the object I was then drawing would be invisible to me a week later, in London, *by reason of moonlight only*—for the visibility of small stars proves the clearness of the atmosphere—how could I have credited it? I feel, therefore, that I cannot expect to be believed unless the whole circumstances are told, even though they betray my uncertainty about stellar configurations when deprived of the aid of a map.

J. HERSCHEL

ON Wednesday, the 25th instant, at 6.10 a.m., Mr. Hodges and I again obtained two measures of position of the nucleus with the equatorial, after correcting for instrumental errors and refraction, the mean of the readings comes out R.A. 10h. 6m. 48s., Dec. 17° 2' 55". But owing to flexure of the instrument and to the fact that the circles read only to 20" and 2s. respectively, these figures are open to correction. Daylight, with a little haze, had so far advanced when the measures were completed, that only the nucleus was distinguishable in the telescope; but with the filar micrometer I measured its length; the mean of two readings came out to 41" 5, but owing to the gradual shading off of the nucleus, one's readings might vary 5" according to its assumed limits. The width I made about 10". I was rather surprised at these results, as I had estimated its length two days before at about 10" only; but I had then used an eye-piece to which I am not accustomed, and my estimate was probably an error. The position angle of the major axis of the nucleus was 108° 7'.

Though the comet was fainter by reason of the bright moon, still we could trace the tail as far as on Monday, the 23rd.

We viewed the comet at 5 a.m., but owing to buildings in the line of sight, we got no reliable readings until 6 a.m.

In my sketch of the nucleus in your last issue, the engraver

has made it round, with a fainter elongation. It appeared of nearly the same brightness throughout. GEO. M. SEABROKE
Temple Observatory, Rugby, October 30

I SEND herewith two sketches of the comet made by me on the mornings of October 23 and 31, and a few brief particulars which may be of some value.

October 23, 1882, at 4.30 a.m., the first sketch was made. At 4 o'clock the atmosphere was exceptionally clear, and the sky continued cloudless until 5 o'clock, when a few light clouds appeared. The comet was not brilliant, although clearly seen. Nucleus with coma presented an indistinctly outlined disc a few degrees above the horizon, and obliquely upwards was a tail which stretched more than 15° across the sky. I compared the extent of tail at the time with the distance between α and β Orionis, and the tail had decidedly the best of it. Whilst glancing from the comet to Orion, I saw in the intervening sky-space, in little over three minutes, no less than *five* meteors, one of which left a long luminous trail visible several seconds. The extremity of the tail was broad. Its *under* boundary was a well-defined line about 40° from the horizontal, and was slightly convex downwards. The *upper* boundary was about 45° from the horizontal, was nearly straight, but very ill-defined, the light fading away into darkness very gradually upwards. The fanning out of the tail was very rapid towards the far end. The termination was somewhat fish-tail shaped, since there was centrally a deepish concavity between the extreme limits, which projected horn-like. The light of the tail was broken into two unequal areas by an obscure streak. The inclosed lower area was the smaller and decidedly brighter, and on its lower side contained a still brighter area, that, starting from the upper part of the coma, gradually passed into the lower boundary.

October 31, 1882, at 5.30 a.m., the second sketch was made. The atmosphere was again very clear, but the moon's light dimmed the comet greatly, and exactly at 6 o'clock it and the coming dawn rendered it indistinguishable. The naked eye could distinguish none of the features observed on the 23rd, but the general outline had somewhat changed, and the comet had changed its position relatively to the stars. ARTHUR WATTS
Manor House, Shincliffe, Durham, October 31

MAY I beg the readers of NATURE, who possess good measures of the course of the great comet, kindly to publish them in NATURE? I would also be very much obliged for good measures of the distances of different envelopes of the head from the nucleus. The measures are desirable in two directions—*towards* the sun, and *perpendicularly* to this direction. Of the greatest scientific interest would be a complete series of measures during the whole period of visibility of the comet, and especially in the first and last days of this period.

B.

"The Burman"

MR. E. B. TYLOR, in his review of "The Burman" in NATURE (vol. xxvi. p. 593), has fallen into an error which it may be well to correct. He says that the tattooing on the body of the "Greek nobleman," Georgios Konstantinos, "was evidently done by Burmese tattooers, and is a masterpiece of their unpleasant craft." This is a mistake into which even a man who had seen many specimens of Burmese tattooing, might fall. But it could never be made by a Burman. The general resemblance to the decorations on the Burman's thighs is close enough, but each separate figure, when done by the Burmese Sayah, is surrounded by a border of Burmese letters, in many cases as a mere ornament, but in not a few with a special cabalistic meaning. Still, however blurred with age, they can always be recognised as Burmese characters. I went down and examined the "tattooed nobleman," which he was good-natured enough to allow me to do very closely, and the result was to convince me that it was no native of Burma who so cruelly victimised the poor man. The frames of the figures might have been letter, but if so, they were of some language with which I am unacquainted. Moreover, many of the figures themselves were such as a Burman Sayah never uses; such as especially the birds and serpentine creatures, while the elephants were of a very inferior character. The BeeLoos (ogres) and Kyah-BeeLoos (tiger-ogres), moreover, which appear on every Burman's legs, were absent, and, most conclusive of all, there was not a single inn, not one cabalistic square. No Say-Sayah I ever knew would have had self-control enough to have omitted the signs of his wisdom in magic. Mr. Tylor says the story of Konstantinos is "mostly

fictitious." That may be, but if he was not tattooed in Central Asia, it is difficult to say where it could have been done. I may also mention that the "nobleman" did not understand a single word of Burmese, and did not recognise a Burman, which could hardly have been the case if he had suffered his "punishment" in Burma. The pain, by the way, is not nearly so great as it is represented to be, and even when a man is tattooed all over the head, I cannot understand his dying or going mad, as Konstantinos's companions are said to have done. When I was tattooed, I had nearly twenty figures done at a sitting, and felt no particular inconvenience, though the actual operation is no doubt "unpleasant."

SHWAY YOE

THE opinion that the "tattooed man" was decorated in Burma has been generally received by anthropologists, and so far as I know, not hitherto contradicted. In addition to Mr. Franks' paper I may now refer to the *Transactions* of the Berlin Anthropological Society, in the *Zeitschrift für Ethnologie*, vol. iv. 1872 p. 201, for an account of an examination of him by Prof. Bastian, who, as an authority on Burmese matters, has been already mentioned in connection with "Shway Yoe's" book. Prof. Bastian says, "as to the Burmese character of the tattooing there can be no doubt. The letters rather point to the Shans, to whose district many treasure-diggers resorted," &c. It appears, also, that Konstantinos, when questioned as to the mode in which he was operated on, described the instrument as a split point carried in a heavy metal handle, which agrees with the Burmese method.

As the "tattooed man" is in part inscribed with actual letters, a copy of these would probably settle the question at once. It is a pity that for some reason photographs of him, which one would think were profitable articles from the exhibitor's point of view, are not (or lately were not) to be had. E. B. TYLOR

River Thames—Abnormal High Tides

THE normal high water in the Pool, or the average of all the tides of the year, is a constant quantity, and is the same now as half a century back, the mean level being 12 inches below the Metropolitan datum of high water of spring tides called "Trinity standard." High water of spring tides averages 12 inches above, and high water of neaps 3 feet 6 inches below that datum. Whilst, however, the ordinary high water is a constant quantity, exceptional tides rise now very much higher than they did a quarter of a century back; on October 18, 1841, a tide occurred which rose 3 feet 6 inches above Trinity, and it was the highest recorded for half a century; eleven years afterwards, on November 12, 1852, 3 feet 7 inches were marked. The land flood of that year is popularly known as the Duke of Wellington's flood, from the demise of the great captain having occurred at that period; no such tide recurred for seventeen years nearly, until March 28, 1869, when 3 feet 7 inches was again reached. Five years afterwards the tide rose, on March 20, 1874, higher than ever before recorded, reaching an excess of 4 feet 4 inches.

These exceptional metropolitan tides arise from the rare concurrence of three causes, viz. an exceptionally heavy land flood meeting an equinoctial spring tide, and these accompanied by a great westerly gale heaping up the Channel sea, suddenly veering to north-west, and driving the tidal wave before it from the North Sea up the Thames estuary. Four reasons may be specified for these results. The first is the greatly increased rate of discharge of floods from the catchment basin. This, however, is questioned by many; but we find Stevenson giving the ordinary discharge as 102,000 cubic feet per minute; Beardmore 100,000 as the annual mean at Staines, and 400,000 as the maximum, whilst O'Connel, in the "Encyclopædia Metropolitana," states it at from 475,000 to 600,000 and Prof. Unwin, of Cooper's Hill College, obtained results during the winter of 1875, at the Albert Bridge, Windsor Home Park, equivalent to from 701,280 to 845,640, or one-third more than any previous estimate.

Secondly, the low-water *régime* of the river has been greatly developed by increased scour and removal of shoals by dredging, so that the head of the low-water prism ascending from seaward, with 20 feet minimum depth, which a quarter of a century back was below the Arsenal at Woolwich, is now above the Dock Yard, two miles higher. Thirdly, the removal of old London, Blackfriars, and Westminster bridges, by raising high water above-bridge 6 to 12 inches, and lowering low water 3 to 4 feet, brings up about 33 per cent. m^{re} tidal water above-bridge than half a century back.

Fourthly, the Thames Embankments have added a few inches to the range, by narrowing, straightening, and regulating the channel by which the tidal momentum has been increased. Now, assuming that the high water of a spring tide is raised from 4 to 6 inches, this, from London Bridge to Twickenham, would amount to 700,000 tons of water, but the additional quantity, due to the removal of the old bridges within the same limits, would amount to six times that quantity, or to 4,200,000 tons.

In an essay by me, recently published by the Institution of Civil Engineers, the proportion of land water as compared with tidal water was estimated at 1-18th of the latter, and that of the 14 inches excess of range over any previously recorded tide in November, 1875, only from 3 to 3½ inches might be due to land water. The Embankment Commissioners of 1861 took the hitherto standard maximum height for quays of 4 feet above Trinity, and this proved a safe elevation until March, 1874; but the tide on November 15, 1875, was 6 inches higher, and forcibly directed public attention to the question, and again on January 2, 1877, the tide rose as high as in March, 1874, and in January, 1881, reached a height of 4 feet 8 inches at the London Docks, and 5 feet here in Westminster, the maximum yet experienced.

The Admiralty Tide Tables of the last twenty years show that 2 feet and 2 feet 1 inch are the maxima to be expected during the equinoxes, but the computors direct attention to the fact that gales of wind will add at times materially to the estimated heights; indeed north-north-west gales will add 1 yard vertically to the computed heights in the Port of London, as the surface of the water at high water will be at times 5 feet higher than at sea with a good spring tide, the tidal column rising upwards at a tolerably uniform rate of 1½ inch per mile in the forty-eight miles from Sheerness to London.

From 1860 to 1863, 6 inches was the calculated maximum above Trinity standard and that observed 3 feet and 6 inches in December 1863.

From 1864 to 1866, 6 inches was again the estimated excess, and 3 feet and 6 inches again the actual result in November 1866.

For 1867-1868 they were relatively 4 inches and 3 feet, the last in February 1868.

After this due to the altered condition of the river brought about by the causes just referred to, we have the following results as regards maxima, viz.:-

	Estimated height above Trinity.	Observed height above Trinity.
1869—March	...	3 "
October	1 8	3
1870—February	—	3
March	2 0	—
1871—April	1 8	—
1872—April	—	2 10
September	1 7	—
1873—February	—	3 3
October	2 0	—
1874—March	2 1	4 4 Westminster.
1875—April	1 10	—
November	—	4 9
1876—September	1 5	—
June-Dec.	—	1 11
1877—January	—	4 4
March-Sept.	1 11	—
1878—March	2 1	—
November	—	3 1
1879—March	1 10	—
April	—	3 6
1880—March	1 6	—
November	—	2 9
1881—January	—	5 0
September	1 11	—
1882—February	—	4 6
Aug.-Sept.	2 1	—

During the recent springs we have the following results (at Westminster):—

1882.	Estimated excess.	Actual excess.	Excess.	Wind.
Tuesday, Sept. 26, p.m.	0 5	0 12	0 7	E.S.E.
Wednesday, " 27, "	1 4	1 9	0 5	W.
Thursday, " 28, "	1 11	2 0	0 1	W.N.W.
Friday, " 29, "	2 0	2 6	0 6	W.N.W.